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ABSTRACT

Students' understandings of the concepts of price control, oligopoly, and power before, during, and after taking a social science foundation course (D101) at Great Britain's Open University were investigated. Students were asked 10 questions on key concepts taught in the course. Three of the questions are addressed: (1) Why doesn't the conservative government want to control prices? (2) Does it matter that only two companies (Lever Brothers and Procter and Gamble) produce almost all the soap powder sold in Britain? (3) Why are trade unions powerful? These questions gave different pictures of change in students' understanding after the course. Question 1 showed little change in students' understanding, while question 2 showed a marked trend toward a more sophisticated understanding. Question 3 showed a confusing picture of results. Only for question 2 was there any evidence that the course had improved students' level of understanding. One possible reason for the study results is that changing conceptions is difficult and takes time. In addition, the way the course material addresses a concept may have important consequences for the students' ability to understand the concept. The importance of knowing students' initial constructions within a subject area as well as the approach a student takes to learning (i.e., memorizing versus understanding the message in the instructional materials), is suggested. A bibliography and information on the research methodology of the study are appended. (SW)

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THE OUTCOMES OF LEARNING FROM THE SOCIAL SCIENCE FOUNDATION COURSE: STUDENTS' UNDERSTANDINGS OF PRICE CONTROL, POWER AND OLIGOPOLY

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ABSTRACT

Students studying the Social Science Foundation Course were interviewed at the beginning and end of the course about their understanding of key social science concepts taught in the course. This paper describes students' initial understandings of the concepts of price control, oligopoly and power and how these have changed as a result of studying the course. The key issues in understanding the quality of students' learning outcomes are also discussed.

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THE OUTCOMES OF LEARNING FROM THE SOCIAL SCIENCE FOUNDATION COURSE: STUDENTS' UNDERSTANDING OF PRICE CONTROL, POWER AND OLIGOPOLY

Background

This paper reports a study in which students were asked questions involving basic social science concepts before and after they studied D101, the social science foundation course. In this way we obtained a measure of the outcome of learning in terms of the student's understanding of concepts taught in the course.

A group of 29 students taking D101 as their first O.U. course have been followed through their first year of university study by interviewing them on three occasions. The first interview, before the course started, was concerned with students' orientation to study, their conceptions of learning and their understanding of key concepts taught in the course. The second interview, conducted while the students were working on Block 5 on 'Work', related to their approaches to study. The third interview, at the end of the course, related again to students' orientation to the O.U., their conception of learning and their understanding of the same key concepts covered in the first interview. The background to the study is described in Morgan, Gibbs and Taylor, (1980).

This paper describes results from three of the concept questions asked in the first and third interviews. These concepts are price control, power and oligopoly.

Measuring Outcomes of Learning

The usual measure of the outcome of a course of study is the students' performance on a test or exam. Tests and exams are usually quantitative and attempt to measure how much or how little has been learnt.

An alternative way of measuring outcome is to ask what has been learnt i.e., the content and details of students' understanding or more particularly what is the difference between the students' understanding of certain key concepts or ideas before and after a course of study. This approach has been taken by Dahlgren working in Goteborg (see Gibbs, Morgan and Taylor, 1980a, for a review of this work).

Several of the Goteborg studies have examined in detail what it is that people understand about particular concepts. They do this by asking simple questions involving the concept. For example, in order to find out about students' understanding of the concept of opportunity costs, Dahlgren (1978) asked "Can you define the concept of opportunity cost?" and so on for other similar questions. These questions were asked in individual interviews with students taking an introductory economics course.

The interviews were tape recorded and transcribed and from his analysis Dahlgren was able to find important qualitative differences in the answers students gave. Among the students' answers were two distinct conceptions of opportunity cost. These were described as follows:

A Opportunity cost means that the cost of a chosen alternative of using resources is expressed in terms of the revenue that an alternative usage would have given.

B Opportunity cost is the cost for any of a number of possible alternative ways of achieving a specific goal.

The A type answer contains the 'correct' answer from the economist's point of view whereas a B type answer is less sophisticated. Clearly economics teachers would aim to bring students up to an A type understanding. But what did students understand after a course in economics where this concept was central to the teaching? For the concept of opportunity cost, Dahlgren found that after the course, out of 19 students 10 had type A conceptions, 8 had type B conceptions and one had no conception at all.

This is hardly a very impressive picture of the impact of an economics course on the understanding of economics achieved by the students. Since 15 of these students passed the course it is rather a different picture to that given by the assessment in the examination.

A slightly different technique for measuring the understanding of concepts, and one based on Piaget's original technique, is the 'interview about instances' used by Osbourn and Gilbert (1979). They have concentrated on school children's understandings of basic science concepts because there is evidence to suggest that many science students at universities lack a sound understanding of basic science concepts when they begin their university studies.

The interview about instances method is used to identify the way in which a student understands a word like 'work' which means different things in everyday language and scientific language. This is done by showing the students an illustration of an event and asking 'Is this an example of work being done?' An example of an illustration would be a picture of a ball rolling down a slope or a person climbing stairs. Probing questions were used during and after the student had considered the instances to: "establish if a student knows what questions must be asked to determine if an instance is an example of work being done and hence can describe the attributes of work". (Osbourn and Gilbert, 1979).

From the early trial interviews the researchers were able to see many points of confusion between a students 'intuitive' understanding of the concepts and their understanding of physics.

Their work suggests that many students learn physics without relating the ideas to their everyday experience of the world and that misunderstandings are therefore much more difficult to uncover and change. Osbourne and Gilbert suggest that this separation of physics from reality can cause the students real problems in studying physics at university level.

These methods of determining students' understandings of concepts are similar in that they concentrate on finding out <u>what</u> students

understand rather than how much in terms of a score on a test.

In an earlier report (Gibbs, Morgan and Taylor, 1980b) we described the different conceptions of psychology students had before studying D101. One of our observations was that almost all the students had a conception of the process of psychology that was subjective and intuitive. They did not see psychology as being either objective or scientific. Although most of the conceptions students had were related to what psychology really is, their lack of conceptions involving measurement or scientific method of any kind should alert us to problems they may find in learning about psychology in the course. For example, the students are likely to be very surprised and perhaps confused to find that psychology involves experiments.

The first use of such results as these then, is to provide teachers with a fuller awareness of the different ways a concept can be understood or misunderstood. Showing how different students understand a concept should make teachers more aware of the pitfalls and blind alleys a student might come across while trying to learn particular concepts. "Start from where the students are" has long been a tenet for good teaching and "where they are" can surely be seen much better from this type of investigation than from trying to estimate from quantities such as age, intelligence or grade in an examination.

Secondly, it provides a very different assessment of what has been learnt i.e., the content of learning, from a particular course of study. As Dahlgren (1978) has shown, looking at the quality of learning outcomes can give a different picture of what has been learnt than looking at the pass rate in an examination.

The Study of Students' Understanding of Social Science Concepts

The aim of the D101 study of concepts is primarily to assess the outcome of studying in terms of the change in conceptions the students have after the course. We also hope, since these concepts have not been analysed in quite this way before, to help teachers of these concepts to understand better the problems students may have in learning about them and using them, and so to help them to teach the concepts better.

Method

In order to assess learning outcomes on D101 we asked students questions on key concepts taught in two sections of the course. These questions were asked before the course began and again after the exam when the course was finished.

With the help of the D101 course team we drew up a list of 20 questions covering key concepts taught in Blocks 4 and 5 of the course: 'Production and Allocation' and 'Work'. This was not a simple task as often it was not clear exactly which concepts were basic to the teaching of the blocks and the course team had some difficulty agreeing which concepts were taught in the course at that point. However we managed to draw up a list of 20 questions which were phrased within a context which would be familiar to students having studied the course. For example, the concept of power was asked about in connection with Trade Unions - "Why are trade unions powerful?" - as this is the context within which it is brought up in the course material (Block 5, unit 17b). The questions were all phrased as particular examples of the concepts rather than being asked more directly, e.g. "What do you understand by power?" or "What is power?", in order to avoid learnt definitions as answers which would not give us an accurate assessment of the student's own understanding of the concept. We also wanted to make the concept questions accessible to students before taking the course and so we phrased them within 'everyday' contexts rather than leaving them as abstract academic concepts.

These 20 questions were piloted in individual interviews with four students and 10 questions were selected which appeared to be the best ones for investigating students' understanding of the key concepts in Blocks 4 & 5.

The following questions were chosen for the study of learning outcomes:
(The questions underlined are discussed in this paper).

Q.1 What do you understand by the term social science? What use has social science?

Q.2 If Esso garages were to invite a psychologist in to improve the work efficiency of petrol pump attendants, what would the psychologist do?

Q.3 What would you understand by saying that Bahrein is becoming an industrial society?

Q.4 In Britain it takes 39 people all doing different jobs to make and sell a pair of sandals, why might this be interesting to social scientists?

Q.5 Why don't the Conservative government want to control prices?

Q.6 Why is the rate of inflation currently running at 17%?

Q.7 Surf, Omo and Radiant are all produced by Lever Bros. while Bold, Tide and Dreft are produced by Proctor and Gamble, in fact these two companies produce almost all the soap powder in Britain. Does this matter?

Q.8 Is Britain Capitalist?

Q.9 We say that a train-driver is working class while a teacher is middle class. Why?

Q.10 Why are trade unions powerful?

These questions were asked in one to one interviews with each student at the beginning and the end of the course. Non-directive, probing questions were used when necessary to clarify a point or to find out if the student had anything more to say e.g., "Can you explain what you meant by saying ----------?" or "Is there anything else?" and so on until the interviewer felt that she understood what the student had said and that the answer was complete as far as the student could go. The interviews were tape recorded and fully transcribed. This paper describes students' answers to questions 5, 7 and 10. (The remaining questions will be discussed in a forthcoming paper.)

Analysis

The analysis of this type of interview data takes a long time. Sometimes the students' answer appears ambiguous and often it is difficult to compare one answer with another. We took the analysis through a number of stages which we will describe in detail in the Appendix. The analysis is complicated by the fact that there are two parts: first, to find the different conceptions (understandings) that exist to find a category system and second, to assign students' answers to a category in order to assess the outcome of learning.

Results

Our results are in terms of a category system which describes the different conceptions students had about a particular question. We will describe each category system in turn and show the numbers of students holding each conception before and after the course.

Question 5. "Why don't the Conservative government want to control prices?"

In asking this question we hoped to find out what students understood about different economic policies to do with price control. As well as being dealt with in Block 4 on 'Production and Allocation' this is a subject which has constantly been a feature in the news over the year the students were studying the course (1980).

On analysis of the transcripts we found a hierarchy of four categories which describe four different conceptions about Conservative policy on price control.

A) In this conception students understand that there are two basic ways to control prices: through a prices and incomes policy and through control of the money supply and they say that the Conservatives believe in the latter policy. They describe the monetarist policy but often this description is muddled.

B) In this conception the students understand that the Conservatives policy is to do with their belief in free market competition. Answers in this category range from fairly extensive attempts to explain how the free market works and leads to efficiency, productivity and product choice to bald statements that 'prices find their own level' or that the Conservatives believe in free competition. Within this category there are many muddled accounts of the operation of free markets and of the motives of the Conservatives.

C) This category includes several different sorts of conceptions none of which centrally involve the notion of free markets or monetarism. They include:

'The Conservatives are on the side of big business'.
'Higher prices lead to higher profits so industry does better'.
'If prices are high, people will work harder'.

These conceptions are concerned with the interest groups, profits and incentives but not with free competition.

D) Ignorant answers - 'I don't know'.

The following examples from the interview transcripts illustrate the differences in these four conceptions.

A) "Why don't they want to control prices? - I think they do want to control prices but not through a direct prices and incomes policy. I think they believe that um - by controlling the money supply, prices will control themselves, because if there's less money around to force up the prices, employers or manufacturers will have to reduce the prices so people can, - or keep the prices more or less stable so that people can afford to buy their products".

(Mrs. L. 3rd interview)

B) "Why don't they want to control prices? - eh well they be - at the moment 'cos they are following um - free - freedoms you know, policies and that. They believe that the market will balance everything out, therefore if they control prices they will effect the demand and supply which they just think they will find their own level and which will then eradicate inflation which they think is the worst problem. 'Cos you know if they control prices and therefore other things like wages going up we'd all have more money to spend so they just think it's the market system really - Capitalism basically."

(Mr. V. 3rd interview)

C) "Because it would interfere with the profits of big business and the Conservatives support big business - that's it".

(Mrs. N. 3rd interview)

D) "I still don't think I can answer that one -- no, I can't actually. I enjoyed the power block just as I enjoyed the political bit but I don't really relate it to what's going on at the moment if you know what I mean."

(Mrs. W. 3rd interview)

All the above quotes are taken from the third interview and show the different types of conception as laid out in the category system above. They also, between them, illustrate the kinds of changes that take place between the two interviews at the beginning and the end of the course.

Mrs. L had moved up from category B to A. This is her transcript from the first interview:

"Control prices? - because they want the price to find its own level in the market. So there's competition between companies and the less competitive companies go out of business the more competitive companies get more work and more money. If prices are artificially controlled that would be prevented to a certain extent --------".

Mr. V. has moved from an A in the first interview to a B in the third: this is part of his first answer:

"Oh well I would have thought that they did want to control prices because they are supposed to have a monetarist system aren't they. They are supposed to be initiating it - but I don't really understand why they seem to be doing it half heartedly - I don't think they know what they are doing actually.

I - You mentioned monetarism, can you explain what you mean?

S - Well the system they've been using over the last number of years is Keynsian isn't it - Aggregate demand and supply and having some sort of incomes policy to hold prices down and therefore hold down wages too. Whereas the monetarist system they feel that it's nothing to do with wages it's just the government is printing far too much money and there is a budget deficit and so therefore there is more actual money in circulation people will spend it and because it hasn't resources to back it up therefore the prices rise there's so much money on the market that demand for goods is excess and there's not enough actual goods so the prices rise. So the monetarists want to cut back on lending and the amount of money in the economy."

Mrs. N. has remained in category C and as you can see has not changed her conception at all: this is her answer in the first interview:

"Eh --- it's I suppose well they don't want to - they think if the price is controlled then business is restricted in the amount of profit they make I suppose and then therefore in the amount of expansion. I suppose the Conservatives are always associated with big business and I presume it's to do with the fact that there's you know business wants to set their own prices so that they can expand you know."

Mrs. W. has also remained in the same category as a 'don't know'. Here is her answer in the first interview:

"Don't they? is that the truth? I suppose they do, I don't know, I don't know ----".

Table No. 1 shows the number of students in each category before and after the course. There are 29 students in the original sample, of these only 18 completed the course and two of these did not sit the exam. Of the original 29 one had transferred to a full time course at Warwick University, two had moved house too far away for us to travel to see them and eight had left the course during the year, most of these before final registration. In Table 1 the first column shows the position of all 29 students in the first interview, column 2 shows the 18 who completed the course in the first interview and column 3 the same 18 at the end of the course in the third interview.

Table No. 1

Q.5	1st Interview	1st Interview (18)	3rd Interview
A	2	2	2
B	18	12	13
C	3	2	2
D	6	2	1
	29	18	18

Of the 18 who finished the course three had moved down and three had moved up. Twelve had remained in the same category. In other words there was not a very remarkable shift in students' conceptions. Despite this no student who sat the exam failed the course and no student failed the T.M.A. for Block 4.

Question 7. Surf, Omo and Radiant are all produced by Lever Bros. while Bold Tide and Dreft are produced by Proctor and Gamble. In fact these two companies produce almost all the soap powder sold in Britain. Does this matter?

This question was designed to investigate students' understanding of different types of competitive situations and their effects on price, quality, choice of goods. Oligopoly is a particularly interesting example because it involves more than one possibility according to the type of arrangement or lack of it between the firms involved. Competition within a free market and the problems of monopoly are discussed in some detail in Block 4 'Production and Allocation'.

On analysis of the transcripts we found a hierarchy of four categories plus one category for conceptions irrelevant to the rest of the system (this is not a 'don't know' category). The category system reflects the degree of sophistication and qualification in the answers rather than being completely alternative ideas which is the case in Q.5 above.

A) The extent to which the price/quality/choice of the product is fixed depends on the nature of the cooperation between Lever Bros. and Proctor and Gamble. An 'A' conception is saying that: it would depend on how closely they were working together. If they don't cooperate at all it would be like perfect competition, but if they could organise a cartel it would be like monopoly. So it depends.

B) The price/quality/choice of the product are fixed by cooperation between Lever Bros. and Proctor and Gamble. In this B conception there is no notion of extent. A 'B' type conception is essentially saying: if there's just two they would fix the price between them wouldn't they.

C) The price/quality/choice of the product are affected by competition (or the lack of it). There is no notion of fixing in this conception. C includes many misconceptions about how the extent of competition affects the product. C ranges from those people who believe that having two companies is the same as monopoly to those who believe that two companies is the same as having perfect competition i.e., it is either no competition at all or there is very good competition - either way they believe competition to affect the product and it is this that makes then a C.

D) Choice is affected by the advertising and marketing policy of the companies. There is no conception of the affects of competition. These students are trying to explain why there are so many soap powders and only two companies. The important thing as to whether it 'matters' is whether the housewife has enough choice. A 'D' conception is essentially saying: if firms are really producing different soap powders and not just pretending they are different then it doesn't matter.

O) Price/quality/choice of the product is not discussed. These answers only include discussion of other issues.

The following quotes illustrate these categories:

A) "It could mean higher prices as there's not enough competition between the two companies. But on the other hand, it might mean that the two are in very strict competition with each other and therefore the prices could be kept down because they're trying to fight against each other. So it might matter, it might not, depending on how they chose to work it -- they could come to some tacit agreement that they couldn't undercut each other".

(Mrs. L. 3rd interview. She moved up from a C in the first interview.)

B) "Yes because there's a sort of monopoly. People don't realise it can lead to price fixing - and a lot of unnecessary advertising, it can mean there's a lack of competition and too much control.

I - Can you say what price fixing involves?

S - Well, it's a tacit agreement between companies that set a standard price. There's no competition so no one is forced to set a market price."

(Mrs. U. 3rd interview. She remained in the same category as in the first interview.)

C) "Well, it does matter because you tend to think you've got more choice, you've got all those different powders but obviously you haven't got as much choice as you would think because they're all made by the same factories and if they've got a monopoly then they can really charge whatever prices they like because you don't have anywhere else to go to buy it. Obviously they've got a monopoly and it means that they can put the price up to almost anything they like. But if there's two companies perhaps it wouldn't matter so much because they'd try to outdo one another but this is the situation to avoid - having a monopoly because you lose the choice.

I - So is having two companies almost as bad or not?

S - I don't really know, it should be better shouldn't it with two, because the one should be trying to outdo the other, but I don't know - it seems to go up all the time, so obviously it doesn't seem to stop them but the more companies there are the better because you're ought to have more choice and they are going to try harder to outdo the others by cutting the prices more."

(Mrs. S. 3rd interview. She moved up from a D in the first interview.)

In this quote we can see what might be thought of as a transitional stage. Clearly there are questions in her mind about this situation posed in the questions which makes her see inconsistencies between her answer and the 'real world'. One feels that if one talked to her about the possibility of price fixing she could easily fit this into her answer and become within the A category - because she already had the idea that it depends on the type of competition. Here is the same student in the first interview as an example of the D category:

D) "No - it doesn't matter as long as the people understand. I think alright, I think I already knew that most of the soap powders were sort of produced by two companies but a lot of people don't and they sort of look at all the different things and they think 'Oh, this is something different' and to a certain extent people are being told false information -- I think people should really sort of know what they are getting. I don't think that if they were made by several different firms it would make all that much difference really. We're supposed to have freedom of choice - but freedom of choice of soap powders - I don't know. I don't think it's all that important really."

(Mrs. S. 1st interview.)

O) "I suppose it would matter to a small business if they wanted to break into the market and bring a new soap powder it would be difficult for them to start because they are built up with the extent

of advertising and things - it would be difficult, apart from that I can't see any problems really."

(Mrs. P. 1st interview. She moved to categ ry C in the 3rd interview. Category O should not be seen as inferior to D as what people say in this category is often quite true but it does not relate to the other categories.)

Table 2 shows the categories for each of the students for question No. 7.

Table No. 2

Q.7	1st Interview	1st Interview (18)	3rd Interview
A	0	0	2
B	10	5	8
C	13	10	7
D	3	1	0
O	3	2	1
	29	18	18

There were more moves towards more sophisticated conceptions for this question than for questions number 5, and it would appear that the course has improved students' understanding of competition and the effects it has on products.

Question 10 "Why are trade unions powerful?"

This question was asked in order to find out about students' understanding of the affect of organisation of labour in the form of trade unions and their understanding of the concept of power. Block 5, unit 17b, deals in some detail with the growth of the union movement in Britain and with different ideas about concensus in society. Block 8 deals with the concept of power and goes through a number of theories which analyse it in different ways.

On analysis of the transcripts we found four different categories

of conception plus a fifth category for ignorant or irrelevant answers. This category system is more complex than the previous two because not all the categories can be arranged hierarchically. We found a distinction between those students who thought of power as being essentially coercive power and those who talked more in terms of legitimate power. Interestingly, this is a similar distinction to that used by sociologists (Weber makes distinctions between power due to authority and coercion). We found three levels of conception on coercive power, A, B and C, and a fourth category 'L' which is a 'legitimate power' conception. A, B and C therefore, form a hierarchy whereas 'L' should be seen as a parallel conception.

Coercive power conceptions

A) The power a trade union has depends on it's position:

i. Micro position - depends on how much it will hurt if production stops or how far the workers are prepared to go in their threats.

ii. Macro position - depends on how specialised workers in general are, or how production is organised and which party is in government etc.

This conception is essentially about coercive power of the unions held by virtue of the threat they can pose. It differs from B in that the student is saying that the power can vary with the type of threat posed in different industries or at different times accourding to economic conditions or political circumstances.

B) The power of the trade unions is a result of the mass membership, organisation, legislation, finance which allows them to pose a threat to government/industry due to withdrawal of labour. It differs from B because there is no notion of the influence of the context on this threat.

C) The trade union's power comes from the control they have over their members. Here the trade union is identified with the leaders of the union who are seen as having coercive power over the members e.g.,

by threat of losing job (closed shop regulations) or by the group effect on fear or apathy. This differs from A and B because power is seen as being exercised over the members rather than over the government or industry.

The legitimate power conception

D) Power is legitimate in the sense of being acceptable authority rather than threat and coercion. The trade union's power comes from it's acceptance as a spokesman for the workers e.g., because we're a democratic country or because of legislation. Legislation here is not seen as allowing coercion but rather as conveying the authority to the union to act for its members.

O) Irrelevant or Ignorant
This category covers those students who say 'I don't know' or whose answers are irrelevant to the above system.

The following quotes illustrate these categories:

A) "--- Assuming that they are powerful where do they get the power from? - by the power of combined action - unity is strength. But some unions are more powerful than others and some unions have a bigger stick than others. NUPE and people like that who clean hospitals and empty dustcarts don't have such a big stick as the miners, electricity workers. If the electricity workers go on strike then there's immediate repercussions-----."

(Mr. C. 3rd interview. Remained in the same category from the first interview.)

B) "Well they're not always powerful but I suppose they don't always get what they want do they. But they, the power that they have comes from - they speak for a large number of people so they have a - they've got to add weight to their claims and things and acting for a large number of people they probably have a better chance of getting their demands met than if they just - had an individual action on their own behalf."

(Mrs. C. 3rd interview. She also remained in the same category from the first interview.)

C) "Because most of the members like me don't participate in the running of the trade union. That's probably one fairly good reason. I think they are powerful because the more moderate people don't participate this leaves the loud mouths to say the vote. I'm not blaming the trade union leaders, they are there to sort of be

guided by everyone by their membership but it does seem to be the hotheads that carry the thing. More people should attend meetings, I think we're all a bit apathetic about it all perhaps."

(Mrs. H. 3rd interview. She remained in the same category after interview 1.)

L) "Well I should think it's because the country is sort of a democratic country everyone has freedom of speech and the trade unions have grown up to be the speakers of the people of their unions and that's how they've become so powerful because the unions have the right to protect their sort of membership to demand what they think is fair--."

(Mrs. W. 1st interview. She moved from L to B in the 3rd interview.)

O) "Because of hard work - that's the man in the street answer -- they are deep searching questions you know - you've got to go back through trade union history to answer that. You can give an off the cuff answer but it won't be the right answer you know, it's just an emotional answer - you need a psychiatrist to unravel it. Plus - if I knew I wouldn't be doing the course."

(Mr. F. 1st interview. He left the course after the first few weeks, so is not in 3rd interview.)

The biggest change within the system was one student who moved from a C to an A. Here are the extracts from the 1st and 3rd interview answers given by the same student to demonstrate what a change in this category system looks like:

C) "The trade unions used to serve their members but now they are too concerned with politics. They think of all the weird and wonderful things like the closed shop which turned out to be the biggest loss anyway because it doesn't do anyone any good and they do individuals a lot of harm. People individually would be against the closed shop but they don't have secret ballots, it's who is sticking their hand up and if you don't stick your hand up it's a sharp nudge in the ribs - I've seen it happen. This is the other thing you see the unions are powerful because the leaders want power, they are power mad, they want the unions for their own - it's a means to an end---."

(Mr. O. 1st interview.)

A) "It's their ability to hold to ransom or to stop the motion of life itself er the prime example being the winter of discontent and so on. But they are only powerful when people are prepared to put up with it. If you want more pay and the bloke down the road is offering £10 a week more then the sensible thing is to go and

move there and if you argue that there aren't any more jobs because there's unemployment well then in that case you aren't entitled to a wage rise because you are not - your labour can be dispensed with if you like - there's always somebody prepared to take your job at that price."

(Mr. O. 3rd interview.)

Table shows the changes in students' conceptions for question 10.

Table No. 3

Q.10	1st interview	1st interview (18)	3rd interview
A	11	7	4
B	9	5	10
C	4	2	1
L	3	3	3
O	2	1	0
	29	18	18

There were quite a number of changes from the 1st to the 3rd interview but some of these were up and some downward direction.

For this question there is a complicated picture of the changes within the hierarchy of A, B, C and O, four had moved upwards and four downwards. The shift is towards the conception of category B, which, given that more people had the more sophisticated conception A in the first interview, is not really a heartening result.

Commentary

So what do these results mean in terms of the students learning from D101? What use is this kind of study for course teams wishing to know how to improve students' understanding of basic concepts?

Firstly, these questions give very different pictures of change in students' understanding after studying D101. Question 5 shows

little change in students' understanding while Question 7 shows a marked trend towards a more sophisticated understanding. Question 10 shows a confusing picture of movement up and down the hierarchy. Only for Question 7 could there be said to be any evidence that the course had improved students level of understanding. This is not to say that the course had not changed anything in the students' understanding of the concepts. There may well be changes in the approach students take in answering the question, for example more qualification within the answers the students give or a shift towards more objective and less opinionated answers. But this is not investigated here. As far as the level of conception is concerned these three questions do not give a very encouraging picture of the outcome of studying D101 for the students' ability to answer these questions. Why might this be so? There seems to be three explanations for this:

(i) Changing conceptions is difficult and takes time

Northedge (1976) has drawn our attention to the constructivist view of learning expounded by Kelly (1955). The constructivist view of the learning process is that of negotiation within the learner between present construction of reality and new knowledge including other people's construction of reality. Kelly argues that it is a basic human drive to improve our construct system. As Northedge (1976) explains:

> "Nevertheless, development is not accomplished easily or comfortably. A change in any fairly basic construct will, he suggests, have implications for many other connected constructs -- and such a change will therefore only be considered by someone on a very tentative exploratory basis. By implication we may take it that acceptance of a new construct system presented by a teacher involved the student in cautious negotiation; falling out; withdrawing to consider; even retreating to safer 'known' views for a time. No matter how logically and clearly a new construct system has been presented to him, a student will need time to try it out if he is going to make it part of his thinking processes rather than simply commit it to rote memory."

Other researchers have pointed to the difficulty of going through basic changes. Perry (1970) has developed a scheme of intellectual development through discussions with students over many years at a liberal arts college. He points to the courage needed by students to venture out beyond their existing understanding. It may be that changes, even in quite specific conceptions, take time and that students need more than just to be 'told' about the preferred construction of the teacher.

Since we have asked students questions involving 'everyday life' students rarely tried to 'remember' by rote any of the course material. Most were using their internalised everyday understanding to answer the questions. How far the course material had changed these understandings is shown in the results. For some students, the course material is clearly 'comfortable' enough to be used as any other knowledge and brought to bear on the answer to the question. For others it was still remote; 'out there' and not internalised or used in the answers they gave. For example:

"Just answering these questions you think - Oh I don't know, social science terminology if you like, because I remember answering them last time, ... I do feel silly if I use things like 'life chances' or mention Goffman or whatever, do you know what I mean? Because, somehow it's - it's not the natural me yet, but it's another part of me."

It can be seen that a student's development as a learner has an important influence on what is actually learnt.

(ii) Teaching Strategy

The way the course material goes about trying to teach a concept may have important consequences for the students' ability to understand that concept. From the above constructivist view of learning we can see that developing a conception involves negotiation of one understanding of reality with another more sophisticated or different conception of reality. No longer is 'telling', even in a clear and concise manner enough for effective learning to be encouraged. We have to engage the students in a negotiation between their own constructions of the subject and that in the course material in order to change these constructions.

This in itself has implications for what we need to know in order to teach effectively. We need to know about students' initial constructions of reality within the subject area involved. It is obviously not possible to know all the different constructions of a particular idea students have, but by asking questions like those we have discussed here it is possible to find a fairly limited number of discrete differences in conceptions which can inform teachers. For example, with Question 7 we found fairly logical distinctions in students' understanding of the effects of market competition. This category system could be used to begin the teaching of this concept by taking students through the steps of this category system and showing how the next step up is a more sophisticated and full account of what happens in oligopoly conditions. In this way teaching would have the best chance of engaging the students in thinking about his own understanding and relating that with the new ideas being presented. As we have said before, starting from where the students are has long been a tenet of good teaching, this may mean that we need to know much more about the different ways in which students construe knowledge.

In one sense constructions of reality are infinite, however it is possible to find, for any one concept, a fairly small number of categories to describe students' answers.

This type of 'front-end course design' would seem to be a valuable activity for IET curriculum developers. For a course team to have available a number of different conceptions and misconceptions of key ideas that students may have at the start of their course would make the task of writing 'for the student' easier and lead to more effective teaching materials.

(iii) The students approach to learning

The way concepts are learnt and the design of the teaching material may provide a large part of the answer to why students do not learn concepts effectively. But the approach a student takes to learning also has a crucial effect. Students differ in what they believe learning to entail (Morgan, Gibbs and Taylor, 1981). Some students believe that learning is memorising material while others place emphasis on under-

standing the message in the text. A student who believe learning to involve memorising material may well be able to answer an anticipated examination question by regurgitating material learnt in this way but will find more difficulty in answering a question involving those ideas in a new context. These students tend to approach the course material in a surface approach i.e., they are concerned to memorise facts contained in the text rather than to understand its message. Their learning is passive, whereas a student taking a deep approach is engaged in actively thinking about the material (Marton and Saljo, 1976). Those students taking a surface approach to learning will have less understanding of the implications of what they have learnt. From these students we would expect little change in their conception of the ideas taught in the course.

Conclusion

What we have said in this report is that the changes in understanding shown in these three questions show neither a consistent nor a very encouraging picture of the effect of studying D101. We have given three reasons why this may be so. Further papers will relate the outcomes of learning to the particular approaches to study that students adopted.

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Appendix

The Process of Analysis

Stage 1. Finding the Categories

First the transcripts are read through a number of times to familiarise ourselves with the variety of answers. Then qualitatively distinct parts of answers are separated out until there is a list of all the differences between and within answers. These are studied until the smallest number of differences are found which seem to incorporate all the important differences in the answers. From this a category system is formed which describes these differences. For some of the questions alternative category systems were discussed before agreement was reached. Because of the complexity of dealing with the transcripts in this way we tended to work separately on different questions at this stage and work as a group when a category system was worked out sufficiently to be tested out by the others. This usually resulted in adjustments and refinements being made to the category system.

Stage 2. Assigning Answers to Categories

Once a category system is agreed the next stage is to use this system to distinguish between students' answers. This involves reading through each transcript very carefully and assigning it to one category within the system. This is done independently by each member of the group and the level of agreement assessed. We then meet to discuss disagreements by looking again at those we disagree on and seeing why there is disagreement. Sometimes a disagreement is because one of us has not read the transcript carefully enough and so misassigned it, other times it is a difficult transcript in that the approach the student has taken is idiosyncratic and makes assignment to a category difficult. Other times it is to do with the interpretation of the category system or the emphasis put on different parts of the transcripts by different readers. In these later cases the category system has to be refined or more description given in order to get over the difficulty. If the disagreement level was high due to these

last two problems we repeat this stage with the refined category system. Usually this has not been necessary but for one question we have gone through this stage three times. (Not one of the questions reported here.)

Stage 3. Judging

Here we give the transcripts and the category system to an external consultant who is familiar with the type of methodology involved but not with the particular study of D101. (Here it was Diana Laurillard from the I.E.T. Surrey University.) Her job was to use the category system as we had done in Stage 2. We then looked at the agreement between the Study Methods Group's categorisation and that of the judge and as in Stage 2 meet to discuss any disagreements. Again if the disagreements are to do with problems with the category system we go back to Stage 2 but this happened in only one case (not with the three questions reported here). The agreement between the judge and the Study Methods Group before discussion was as follows:

	1st Interview	3rd Interview
Q.5	80%	90%
Q.7	50%	90%
Q.10	75%	60%

For Q.7, 1st interview, the disagreement was due to different interpretations of categories B and C. The wording of the categories was changed, after which agreement was reached.

For Q.10, 3rd interview, the disagreement was due to the judge having put more people in the 'O' category as being irrelevant to the category system but with discussion agreement to put them within the category system was reached.

The average level of agreement before discussion was approximately 75%. After discussion, agreement was 100%.

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